



Version: September 2019



**TECHNICAL DETAILS (continued from page 3)**

<b>Stereo Separation</b>	At 100% modulation = 3.5 Vp-p, > 64 dB, 20 Hz - 15 kHz. 68 dB typical at 400 Hz
<b>Baseband Spectral Protection</b>	Pilot Protection, 19 kHz ±200 Hz, no composite limiting: >99 dB, 2 dB composite limiting: >79 dB with reference to 9% pilot injection RDS Protection, 57 kHz ±2 kHz, no composite limiting: >67 dB, 2 dB composite limiting: >63 dB with reference to 6% RDS injection
<b>Digitized SCA Inputs</b>	2 x digitized analog; summed into the digital composite but do not appear on the analog composite outputs
<b>Non-Digitized SCA Inputs</b>	2 x non-digitized analog on BNC connectors; summed into the analog composite outputs but do not appear at the digital composite outputs SCA1 input can be configured to accept the composite output of a backup audio processor or stereo encoder with hardwire bypass to analog comp output #1. SCA2 input can be configured to supply a 19 kHz pilot reference
<b>Windows PC Software</b>	Included in delivery; requires Microsoft Windows® 7 OS or higher; PC connection via TCP/IP protocol via direct cable connect, modem or Ethernet interface (RJ45) or serial RS232 interface
<b>GPI Interface</b>	8 x user-programmable inputs, floating on DB-25 male connector
<b>Tally Outputs</b>	2 x NPN open-collector
<b>Voltage</b>	90–240 VAC, auto-selected, 50–60 Hz, 50 VA, dual-redundant
<b>Dimensions (W x H x D)</b>	19" x 5.25" (3U) x 15.5" / 48.3 cm x 8.9 cm (3U) x 39.4 cm

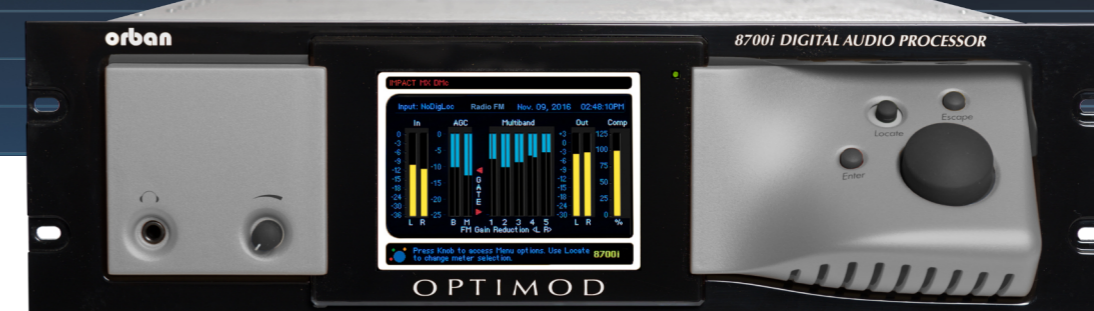
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OPTIMOD 8700i LT is the light version of Orban's flagship processor 8700i. It provides the versatile five-band and two-band processing of the 8700i and with this the industry's most consistent sound for your station. Both analog FM transmission and digital media including DAB+, HD Radio and Streaming are supported by the OPTIMOD 8700i LT.

**Key Features**

**Quick Setup** provides a guided, systematic procedure for setting up the 8700i LT. It should be adequate for most users without special or esoteric requirements.

Easy **LESS-MORE** adjustment of the dynamics processing lets anyone get excellent results, while processing experts can fine-tune to their exact preferences with Intermediate or Advanced Control.

**Six Processing Structures:** You can select between six processing structures that are Five-Band (or "Multiband") for a consistent, "processed" sound with 17 ms delay (typical), free from undesirable side effects, Low-Latency Five-Band (12 ms delay), Ultra-Low-Latency Five-Band (3.7 ms delay), and Two-Band (17 or 22 ms delay) for a transparent sound that preserves the frequency balance of the original program material. Additionally, the 8700i has two "MX" processing structures - one Five-Band and one Two-Band - which include the exclusive, advanced MX peak limiting technology to decrease distortion while achieving substantial improvements in transient punch and high frequency clarity.

**Subharmonic Synthesizer:** The Subharmonic Synthesizer creates energy one octave below program energy in the range of 50-90 or 60-120 Hz when such energy is not present at the input and when music is detected. It adds punch and slam to older material while retaining musicality and prevents introducing unnatural coloration in male speech.

**Multipath Mitigator:** Applied to both the analog and digital radio processing chains, the phase skew corrector minimizes L-R energy that can cause multipath distortion while preventing comb filtering in mono receivers and stereo receivers when they blend.

The **Sophisticated Bass Pre-Limiter** has a new algorithm that generates carefully time-aligned, bandwidth-controlled harmonics that minimize the peak level of the bass so that very low frequencies can actually exceed 100% modulation. The main benefit is the ability to use more bass clipping without generating objectionable distortion in the upper mid-bass frequency range. This features facilitates tuning a preset for more bass punch.

**Speech and Music Detection:** The OPTIMOD automatically detects if voice or music is being processed and allows you to set up the processing individually for both.

**"True Peak" Control** for the digital radio processing with an accuracy of better than 0.5 dB. For typical program material, accuracy is 0.2 dB.

**ITU BS-412 Multiplex Power Control:** An improved BS-412 Multiplex Power Controller provides a new user-adjustable, program-adaptive algorithm to make operation smoother and more subtle.

**ITU-R BS.1770-4 Loudness Control** for both analog and digital radio processing chains facilitates compliance with modern target loudness recommendations like EBU R 128 and allows users to obey any associated government regulations.

**Composite Limiter/Clipper:** A two-stage "Half-Cosine Interpolation" composite limiter provides excellent spectral protection of the pilot tone and SCAs (including RDS). For those preferring the sound of conventional composite clipping, the first stage can be run as a conventional composite clipper while the second-stage Half-Cosine Interpolation Limiter provides overshoot compensation, all with full spectral protection.



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**SSB Stereo Encoder Operation:** Allows its stereo encoder's stereo subchannel modulator to operate in an experimental compatible single sideband/vestigial sideband mode. In SSB mode, the subchannel modulator acts as a pure SSB generator for L-R material in the frequency range of 150 Hz to 17 kHz and as a vestigial sideband generator below 150 Hz.

**Low-Delay DJ Monitor Output:** A new, dedicated headphone monitor chain provides a full five-band FM processor that lets you dial in your preferred amount of "FM clipper sound".

**Digital MPX:** A 384/192 kHz AES3 digital composite output is available that is compatible with the 192 kHz standard being implemented by several transmitter manufacturers.

**10 MHz/Wordclock Reference Input:** A reference input allows the internal DSP clock, the stereo pilot tone frequency and digital composite output sample rate to be locked to a 10 MHz or 1 x wordclock reference signal, facilitating single-frequency-network (SFN) and near-single-frequency-network (N-SFN) operation.

**RDS:** Built-in fully-featured RDS/RBDS generator that supports static and dynamic RDS values.

**Ratings Encoder Loop-Through:** A ratings encoder loop-through is available. You can place it between the AGC and the FM-HD/digital radio split (allowing one ratings encoder to be used for both FM and HD/digital radio), or between the FM analog limiter output and the stereo encoder (to maximize the drive level to the ratings encoder and to avoid passing the watermark through FM peak limiting).

**Defeatable Analog FM and HD/DAB+ Processing Delay:** Important for radios with automatic crossfades between analog and digital, a configurable delay can be added to either the FM chain or to the HD/digital and FM chains to ensure time-synchronized reception of the FM and the HD radio/DAB+ signals. Configurable so that delay changes occur in the digital radio path, preventing any disturbance of the analog FM signal.

**Bypass Test Mode and Tone Generator:** A Bypass Test Mode can be invoked locally, by remote control or by automation to perform a broadcast system test or to compare easily original and processed sound. A built-in line-up tone generator facilitates quick and accurate level setting.

**Safety Bypass Relays:** Analog, AES3 digital and analog MPX inputs and outputs have hard-wire safety bypass relays in case of hardware or power failures.

**Dual Power Supplies:** The 8700i's dual power supplies with independent AC line inputs provide redundant operation to ensuring maximum uptime.

**SNMP Support:** The SNMP (Simple Network Management Protocol) feature allows you to monitor your OPTIMOD's status and to send alarm notifications via your OPTIMOD's Ethernet connection to your network.

**Remote Control or front panel operation:** You can operate and configure the 8700i LT comfortably via the supplied Windows PC Software using your local network or the Internet. Alternatively all functionalities are also available via the front panel with its color display.

## TECHNICAL DETAILS

**Total System Distortion (de-emphasized, 100% modulation)**

<0.01% THD, 20 Hz - 1 kHz, rising to <0.05% at 15 kHz. <0.005% SMPTE IM Distortion

**Frequency Response**

Follows standard 50µs or 75µs preemphasis curve ±0.10 dB, 2.0 Hz - 15 kHz. Analog left/right output and Digital output can be user configured for flat or pre-emphasized output

**Sample Rate**

64 kHz to 512 kHz, depending on processing being performed

**Total System Separation**

> 55 dB, 20 Hz - 15 kHz. 68 dB typical

**Peak Overshoot at HD Output**

0.5 dB True Peak maximum; 0.2 dBTP typical

**Defeatable Analog FM Processing Delay**

0.27 to 12.0 seconds

**DAB+ /HD Mode Delay**

0.365015625 to 8.0 seconds (FM path); 0 to 6.0 seconds (HD path)

**Minimum Processing Delay**

3.7 ms to 270 ms, processing structure dependent  
Multipath Mitigator delay = 146 ms  
Subharmonic Synthesizer delay = 67.5 ms

**Low-Latency Monitor Output Delay**

6 ms

**Analog Audio Inputs/Outputs**

Stereo on XLR connectors, with relay bypass  
Nominal Input level: -4.0 to +13.0 dBu (VU) or -2 dBu to +20 dBu (PPM)  
Output level: -6 dBu to +24 dBu peak

**Digital AES Audio Inputs/Outputs**

1 x Stereo input on XLR, 24 bit resolution, with relay bypass  
1 x Stereo input or SYNC input on XLR, 24 bit resolution, with relay bypass  
Input Reference Level: Variable within the range of -30 dBFS to -7 dBFS (VU) or -23 dBFS to 0dBFS (PPM)  
2 x Stereo outputs on XLR, can be individually set to emit the analog FM processed signal, the digital radio processed signal, or the monitor signal  
Output Level (100% peak modulation): -24.0 to 0.0 dBFS software controlled

**Sampling Rate**

32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, and 96 kHz

**Wordclock Sync Input on BNC Connector**

1x word clock or 10 MHz clock, automatically selected  
DSP master clock can be phase-locked to these signals, which phase-locks the 19 kHz pilot tone frequency, facilitating SFN operation. Digital output sample frequency can also be locked to these signals.

**Composite Baseband Outputs**

1 x 192 kHz AES3; 2 x analog providing -12 dBu (0.55 Vp-p) to +12.0 dBu (8.72 Vp-p) levels for 0.1 dB adjustment resolution

